

**WE CLAIM:**

1. An ultrasound transducer for ultrasound transmission and/or reception, the ultrasound transducer comprising:
  - at least one transducer element;
  - a backing block adjacent the at least one transducer element, the backing block comprising a composite of first and second materials, the first material including a plurality of pockets filled with but not bonded to particles comprised of the second material.
2. The transducer of Claim 1 wherein the first material comprises epoxy and the second material comprises silicone microspheres.
3. The transducer of Claim 1 wherein the pockets are less than 20  $\mu\text{m}$  along a maximum dimension.
4. The transducer of Claim 3 wherein the pockets are less than 13  $\mu\text{m}$  along a maximum dimension.
5. The transducer of Claim 1 wherein a density of the first material is within 10 percent of a same density as the second material.
6. The transducer of Claim 1 wherein the first material comprises a first fraction of the volume of the backing block and the second material comprises a second volume fraction of the backing block, the first volume fraction being within 10 percent of a second volume fraction.
7. The transducer of Claim 1 wherein the first material has a first acoustic impedance to ultrasound and the second material has a second acoustic impedance to ultrasound, the first acoustic impedance being within 10 percent of the second acoustic impedance.

8. The transducer of Claim 1 wherein each of the plurality of pockets comprises a substantially spherical volume.
9. The transducer of Claim 1 wherein the first material is incompatible with the second material.
10. The transducer of Claim 1 wherein the pockets of the second material are enclosed within the first material, the second material unbound to the first material.
11. The transducer of Claim 10 wherein the pockets of the second material are operable to generate friction against the first material in response to applied acoustic energy.
12. The transducer of Claim 1 wherein the first material interconnects throughout the backing block, the backing block having a stiffness about the same as the first material.
13. An ultrasound transducer for ultrasound transmission or reception, the ultrasound transducer comprising:
  - at least one transducer element;
  - a backing block adjacent the at least one transducer element, the backing block comprising a composite of first and second materials, the second material incompatible with the first material.
14. The transducer of Claim 13 wherein the backing block includes pockets of the second material within the first material.
15. The transducer of Claim 13 wherein the first and second materials comprise different polymers.

16. The transducer of Claim 13 wherein the first material has a substantially different hardness but substantially the same acoustic impedance as the second material.
17. The transducer of Claim 13 wherein the second material is operable to generate friction with the first material in response to applied acoustic energy.
18. An ultrasound transducer for ultrasound transmission or reception, the ultrasound transducer comprising:
  - at least one transducer element;
  - a backing block adjacent the at least one transducer element, the backing block comprising a composite of solid silicone and a cured, nonsilicone resin.
19. The transducer of Claim 18 wherein volumes of the silicone are enclosed within the resin.
20. The transducer of Claim 18 wherein the backing block is substantially free of plasticizer.
21. The transducer of Claim 18 wherein the composite has an acoustic impedance of about 1-2 MRayl.
22. A method of manufacturing an ultrasound transducer for ultrasound transmission or reception, the method comprising:
  - (a) mixing a plurality of substantially solid particles of a first material with a liquid second material;
  - (b) curing the mixture of (a), the first material free of adhesion to the second material after the curing; and
  - (c) connecting the cured mixture as a backing block to a transducer.
23. The method of Claim 22 wherein (a) comprises mixing cured silicone with epoxy.

24. The method of Claim 22 wherein (a) comprises mixing different polymers.
25. The method of Claim 22 wherein (a) comprises mixing particles having less than 20  $\mu\text{m}$  along a maximum dimension into a liquid polymer.
26. The method of Claim 22 further comprising:
  - (d) casting the mixture of (a).
27. The method of Claim 22 further comprising:
  - (d) centrifuging the mixture of (a) one of prior to the curing of (b), during the curing of (b) and both prior to and during the curing of (b).
28. The method of Claim 22 wherein (c) comprises bonding the cured mixture to a transducer element.